

## CLAIMS

What is claimed is:

1. An apparatus comprising:
  - a tank containing a fluid;
  - a vessel within said tank, said vessel including a compartment that is free of said fluid;
  - a motor housed in said fluid-free compartment; and
  - a shaft connected to said motor and extending from said fluid-free compartment and into said fluid.
2. The apparatus of claim 1 wherein said tank has an exterior that is in contact with air at an ambient air pressure, and wherein said fluid-free compartment is pressurized to a pressure exceeding the ambient air pressure.
3. The apparatus of claim 2 further comprising a source of compressed gas located outside said tank and a conduit extending between said compressed gas source and said fluid-free compartment adapted to communicate gas between said source of compressed gas and said fluid-free compartment.
4. The apparatus of claim 3 further comprising: a controller, a level detector in said vessel adapted to sense fluid level and to send an electrical signal to said controller when fluid in said vessel rises to a predetermined level; said controller electrically coupled to said source of compressed gas and adapted to cause said source of compressed gas to communicate gas via said conduit to said fluid-free compartment upon receipt of said signal from said level detector.
5. The apparatus of claim 4 further comprising a pressure-relief valve electrically coupled to said controller and adapted to open to cause gas to escape said fluid-free compartment upon receipt of a control signal from said controller.

6. An apparatus for agitating a fluid comprising:
  - an enclosure containing fluid extending to a first level in said enclosure, said enclosure including a top;
  - a vessel attached to said enclosure top and extending from said top into said fluid;
  - a fluid-free compartment in said vessel, said fluid extending in said vessel to a second fluid level that is below said first fluid level;
  - a motor disposed in said fluid-free compartment at a position between said first and second fluid levels; and
  - a shaft connected to said motor and extending out of said fluid-free compartment and into said fluid.
7. The apparatus of claim 6 further comprising a conduit extending between said fluid-free compartment and a location outside said enclosure, and a means for supplying gas through said conduit into said fluid-free compartment.
8. The apparatus of claim 7 wherein said enclosure has an exterior that is in contact with air at an ambient air pressure, and wherein said fluid-free compartment is pressurized to a pressure exceeding the ambient air pressure.
9. The apparatus of claim 8 wherein said means for supplying gas includes a gas compressor located on said top of said enclosure.
10. The apparatus of claim 6 further comprising an agitator, said agitator including an impeller in said enclosure and mounted on said shaft at a location outside of said vessel.
11. The apparatus of claim 7 further comprising: a controller coupled electrically to said means for supplying gas; a first level detector in said vessel and coupled electrically to said controller, said first level detector indicating to said controller when said second fluid level in said vessel reaches a predetermined maximum level causing said controller to signal said means for supplying gas to supply gas to said fluid-free compartment via said conduit.

12. The apparatus of claim 11 further comprising: a second level detector coupled electrically to said controller for indicating to said controller when said second fluid level reaches a predetermined minimum level; and a pressure relief valve coupled electrically to said controller and adapted to release gas from said vessel upon receipt of a control signal from said controller.

13. The apparatus of claim 12 wherein said motor is a hydraulic motor and said apparatus further comprises a hydraulic control module coupled electrically to said controller and adapted to control the speed of said motor.

14. An apparatus comprising:

- an enclosure containing fluid that extends to a first fluid level within said enclosure;
- a top on said enclosure and a vessel attached to said top and extending into said fluid, said vessel including a lower end having an opening allowing said fluid to extend into said vessel to a second level, said second level being below said first level;

- a pressurized compartment within said vessel extending between said second fluid level and said enclosure top;

- a motor in said pressurized compartment;

- a shaft connected to said motor and extending from said vessel into said fluid;

- an agitator connected to said shaft and disposed in said fluid beneath said second fluid level;

- a level detector in said vessel electrically coupled to a controller that is disposed outside of said enclosure;

- a source of compressed gas located outside said enclosure and coupled electrically to said controller;

- a conduit extending between said compressed gas source and said pressurized compartment;

wherein said level detector, controller and compressed gas source are electrically coupled so that a signal generated by said level detector and received by said controller causes said controller to signal said compressed gas source to supply compressed gas into said compartment to maintain said second fluid level below said motor.

15. The apparatus of claim 14 further including a platform disposed within said vessel above said second fluid level supporting said motor.

16. The apparatus of claim 15 wherein said level detector is positioned at a location below said platform.

17. The apparatus of claim 16 further comprising an accessway formed in said top of said enclosure into said pressurized compartment of said vessel, said accessway including a removable cover sealed to said enclosure top.

18. The apparatus of claim 14 further including a pressure relief valve electrically coupled to said controller and adapted to lower the pressure within said pressurized compartment upon receipt of a signal from said controller.

19. The apparatus of claim 14 further comprising a means to reduce the rotational speed of said shaft when said first fluid level reaches a predetermined minimum level.

20. An apparatus for retaining a fluid level in a vessel below a pre-determined level, the apparatus comprising:

- a vessel having an opening at a first end thereof;

- fluid surrounding said vessel and entering into said opening to a first fluid level;

- a pressurized region in said vessel above said first fluid level;

- control apparatus to keep said fluid in said vessel below the pre-determined level, said control apparatus comprising:

- a controller;

- a compressor adapted to supply pressurized gas to said pressurized region upon receipt of a control signal from said controller;

- a first level detector in said vessel adapted to send a signal to said controller when said fluid level in said vessel rises to said first pre-determined level;

said compressor and said first level detector being electrically coupled to said controller.

21. The apparatus of claim 20 further comprising a second level detector in said vessel positioned below said first level detector and adapted to send a signal to said controller when said fluid level in said vessel drops to a second predetermined level that is less than said first predetermined level.

22. The apparatus of claim 21 further including means for causing said compressor to stop supplying pressurized gas to said pressurized region when said fluid level reaches said second fluid level.

23. The apparatus of claim 21 further including a pressure relief valve electrically coupled to said controller and adapted to release gas from said pressurized region upon receipt of a signal from said controller.

24. The apparatus of claim 21 further comprising a motor disposed in said pressurized region connected to a rotatable shaft extending from said pressurized region to outside of said vessel; and a plurality of mixing blades connected to said shaft at a location outside of said vessel.

25. The apparatus of claim 24 wherein said controller is coupled electrically to said motor and controls the rotational speed imparted to said shaft by said motor.

26. The apparatus of claim 25, wherein said second level detector in said vessel is adapted to send a signal to said controller when said fluid level in said vessel drops to a second predetermined level that is less than said first predetermined level, and wherein said controller, upon receipt of said signal from said second level detector, causes said motor to lower the rotational speed of said shaft.

27. A method of agitating a fluid in a tank with a rotatable agitator, the method comprising:  
monitoring the level of the fluid in the tank;

sensing when the fluid level in the tank has dropped below a predetermined level;  
signaling a controller that the fluid level is below the predetermined minimum  
level; and  
slowing the rotation of the agitator.